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ABSTRACT

This concept paper begins by arguing that Integrated Performance Support Systems (IPSS) are an imperative for boosting productivity in the workplace and gaining competitive advantage in the marketplace. It then presents the framework for an IPSS solution to meet the challenges of the 1990s. Discussion of the implementation of an IPSS solution identifies three characteristics of a well-designed system: (1) training and education are available to the worker on demand; (2) other elements of the IPSS such as systems reference, company policies and procedures, training, help, competency profiles, and other information are easily accessible by users; and (3) competency profiles based on job analysis and job promotion strategies are available to end users. Each of the elements of the IPSS is then described: system applications (word processors, spreadsheets, databases); online help systems; integrated training; integrated reference; competency profiles; knowledge-based advisors; and system information updates. Explanations of each of the elements are accompanied by diagrams, and a final diagram at the summary level illustrates the workflow of this methodology. It is concluded that the vision of a modern integrated work environment is attainable today provided all critical issues are addressed, including organization and technology change plans, overall system design, and organizational transformation. (DB)

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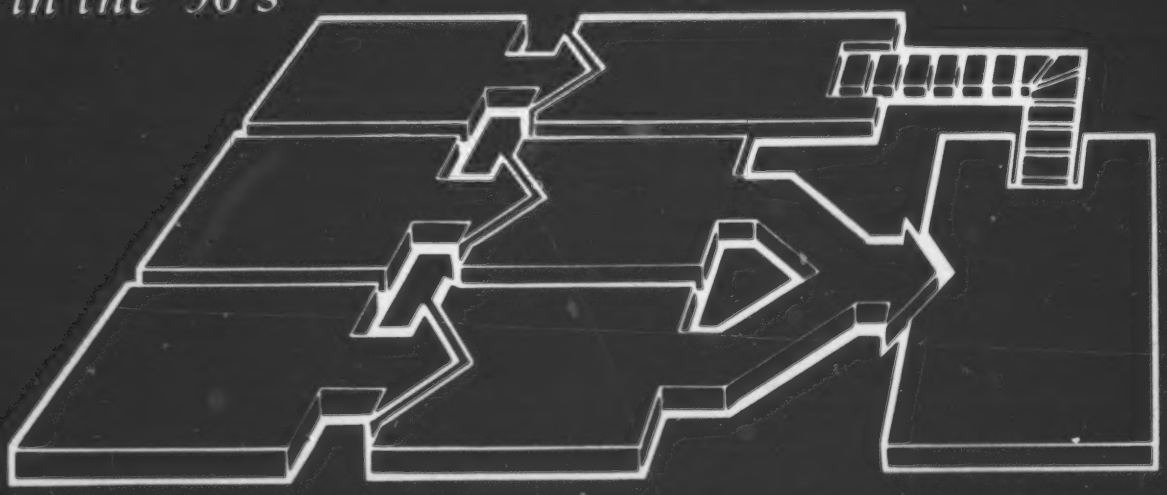
AN INTEGRATED PERFORMANCE SUPPORT SYSTEM (IPSS)

How it can help develop a competitive workforce in the '90's



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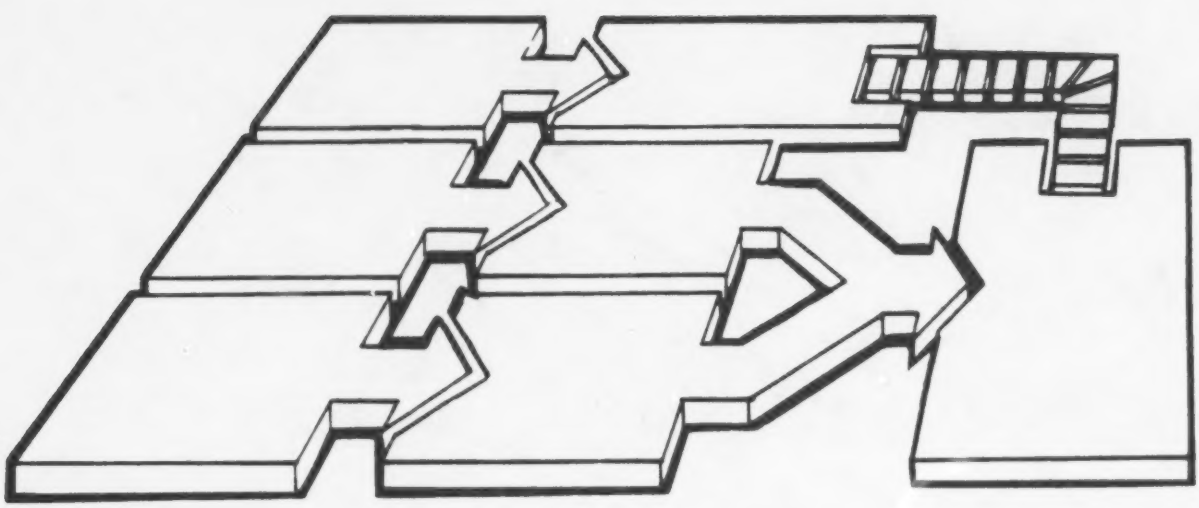
AN INTEGRATED PERFORMANCE SUPPORT SYSTEM (IPSS)



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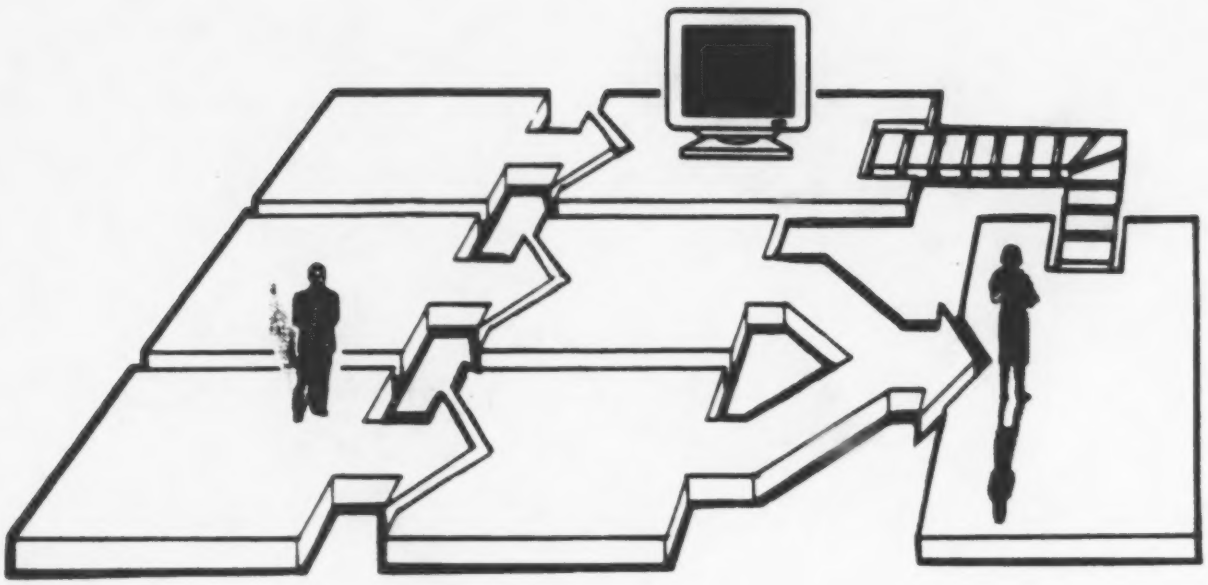
THE INTEGRATED PERFORMANCE SUPPORT SYSTEM SOLUTION



Integrated Performance Support Systems (IPSS)-- An Imperative for Gaining Competitive Advantage

Our country faces a substantial productivity crisis as we enter the 1990s. While change continuously poses new problems, we must stretch our "mindset" to explore new and better ways of leveraging technology and our people to regain a competitive advantage.

This "conceptual overview" describes a planning framework for boosting individual productivity through powerful, integrated solutions. Courseware/Andersen Consulting calls these alternative combinations of hardware, software, and delivery approach Integrated Performance Support Systems (IPSS).

Workforce Challenges

According to *Workforce 2000* (Hudson Institute, 1987), service industries will create all of the new jobs and most of the new wealth in the next decade. These new jobs will demand higher skill levels, at a time when basic skill levels are declining.

Our education system is not producing enough skilled people, so businesses are challenged to provide better education and training to ensure competitiveness. Even the best training courses money can buy often fail to achieve the desired performance results on jobs, which are becoming more complex as firms introduce new products, use sophisticated technology, and expand job responsibilities.

As we enter the 1990s, quality, customer service, and competency requirements are increasing, while performance seems to be decreasing. Clearly, fresh new approaches (such as IPSS) are needed to ensure efficient and effective job competency.

Information System Challenges

The 1980s revolutionized the way we view and use computer technology. We enter the 1990s with powerful desktop tools available to most workers. Yet people and organizations struggle to achieve skillful use of these systems. This "performance gap" is caused, in part, by not focusing on user support and training needs during system planning and application development.

Today's "knowledge worker" may use an information system for many jobs, some requiring sophisticated analysis and problem solving. Formal training rarely teaches solutions for every possible problem. The right documentation, online help, and local support may not be available to users when and where needed.

Organizational Challenges

Most organizations today are structured along traditional lines, so training, documentation, systems, reference, etc. are developed with limited and singular perspectives. Documentation and training are separate, even though the media and approaches support one another. Online help is often written by system developers who aren't familiar with the user's frame of reference, and it is seldom integrated with documentation.

The primary results for users are a steep learning curve and lost job productivity. Other possible negative results are poor customer service, errors, extra on-the-job training or support, underutilized systems, high turnover, etc.

Mindset Challenges

Current perspectives about the workforce and information systems reflect traditional thinking and approaches.

With few exceptions, technology is being used to automate the past. What is needed most are fresh new ways of *integrating* solutions that address today's tough challenges.

Workforce productivity goes beyond traditional training. Integrated Performance Support Systems require non-traditional, non-linear thinking. These systems combine elements into a relational database of text and images. Effective implementation therefore demands a balanced approach:

- For developing a common, creative vision of how an IPSS can empower individuals
- For applying a systematic development methodology

Imperatives for Change

The challenges described above point out some of the reasons why innovative companies are pursuing new productivity strategies...and some of the obstacles they face. We see dramatic changes in traditional industries such as manufacturing, where Japanese just-in-time methods have become the new competitive standard. Adopting such methods is imperative for America to regain its traditionally strong competitive position.

Integrated Performance Support Systems apply similar productivity improvement principles, such as just-in-time learning, optimal workflows, and personal quality commitment. The imperative we see is to improve individual performance by *integrating* available, powerful technologies. Organization lines should be crossed, traditional support roles redefined, training and information components linked in new ways, and software and hardware components combined to empower people to accomplish more difficult tasks in less time.

To regain our competitive edge, we must recognize the problems with the current situation and come up with better

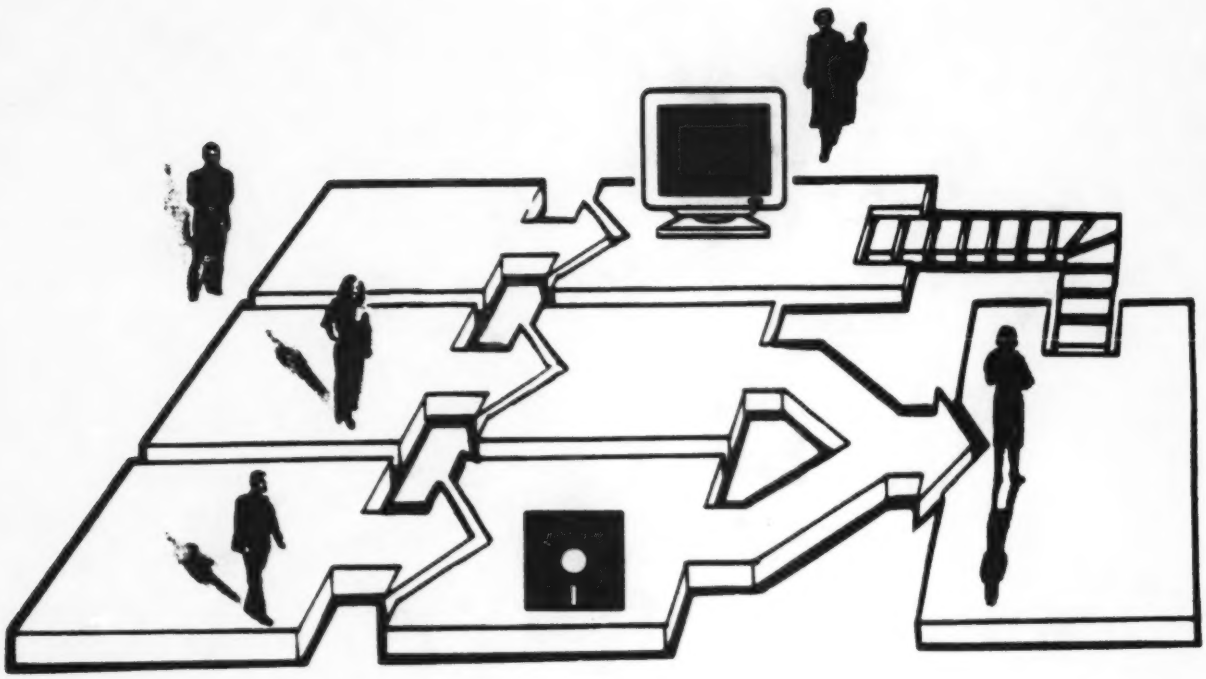
solutions. We believe that Integrated Performance Support Systems have tremendous potential for boosting productivity in the 1990s.

Overview of IPSS Framework

This concept paper describes Courseware/Andersen Consulting's framework for an Integrated Performance Support System (IPSS) solution to meet the challenges of the 1990s.

The next sections should help in creating a vision of what IPSS solutions for the 1990s can be. We believe this is the all-important first step in changing the current mindset. The final section outlines a series of recommended steps for planning and implementing an IPSS solution in the early 1990s.

IMPLEMENTING AN INTEGRATED PERFORMANCE SUPPORT SYSTEM SOLUTION



The IPSS Solution

Today, Integrated Performance Support Systems (IPSS) can provide the basis for better job definition and worker progression within job levels, and can enable workers to more efficiently perform their day-to-day work. At the center of these systems is an empowered end user, the actual worker, willing and able to use such tools and support, supervised by a fully leveraged supervisor.

With the help of today's technology, IPSS can and should be computer-supported and fully integrated with modern software applications and human resource planning and management methodologies.

Well-designed IPSS require a minimum amount of support from supervisors, trainers, or fellow workers, thus enabling the entire human resource system to be fully leveraged.

The characteristics of a well-designed IPSS include the following:

- Training and education available to the worker "on demand," accessed in small increments as needed
- Other elements of the IPSS (systems reference, company policies and procedures, training, helps, competency profiles) easily accessible by users
- Competency Profiles available on the IPSS, based upon careful job analysis and job promotion strategies.

The idea of computer support on the job and at the workstation is not new. Many companies have put in place individual performance support elements. However, few have systematically or fully integrated these elements to reap the potential benefits.

The following section describes our concept of the main elements of a fully integrated performance support system. Figure 1 on the next page diagrams these elements and how they might look to end users if they "signed on" to the system at their workstations. The pages that follow provide more detail on the features, functions, and benefits of each of the elements.

INTEGRATED PERFORMANCE SUPPORT SYSTEM

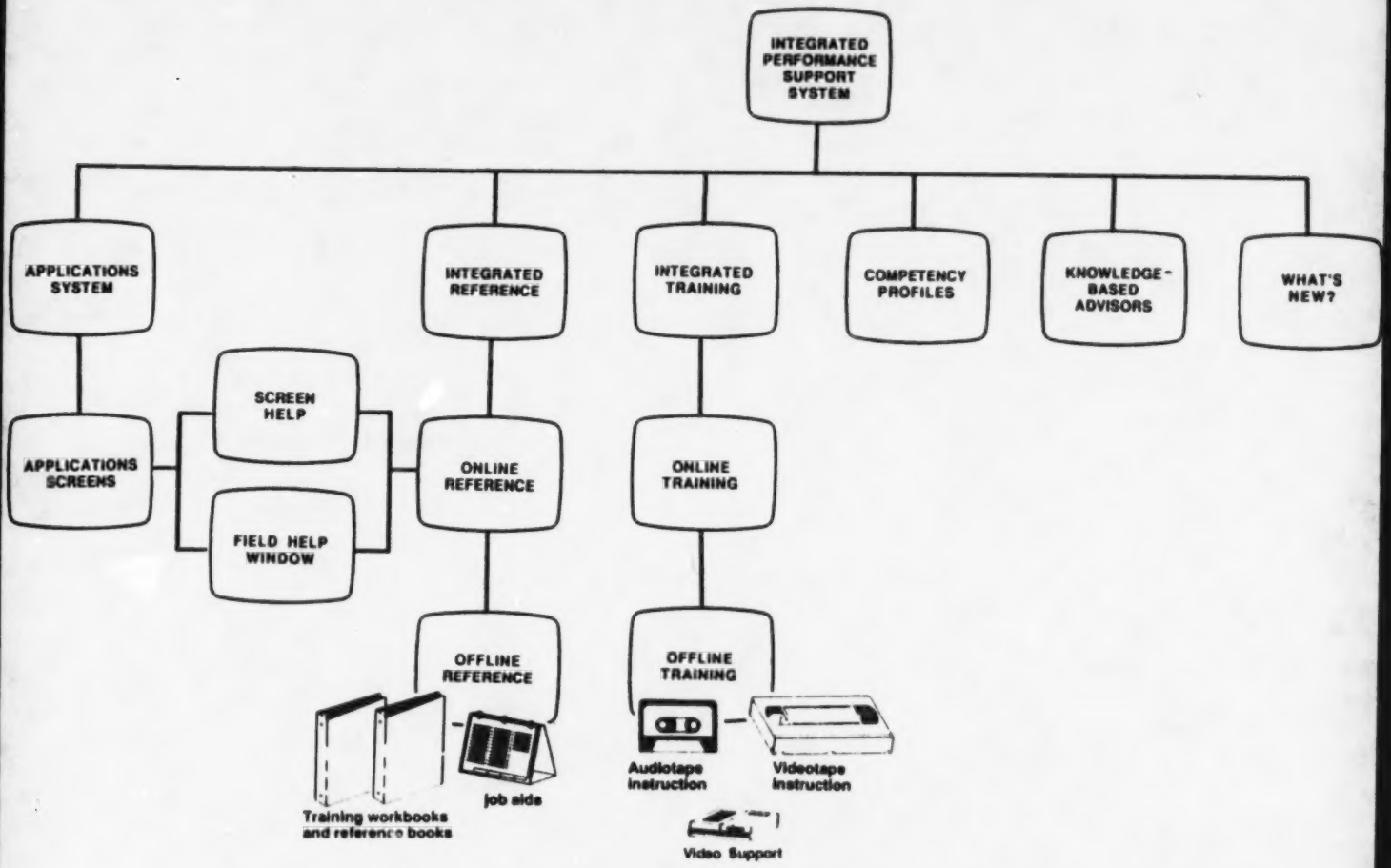
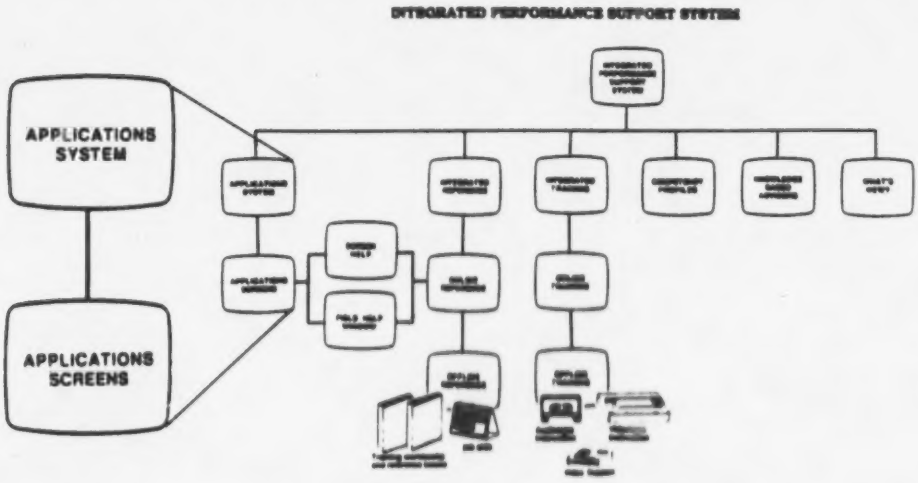


Figure 1

Possible elements of an Integrated Performance Support System (IPSS) include:

• System Applications	Programs and functions that meet the day-to-day needs of end users (e.g., spreadsheets, databases, word processors, and custom-designed applications).
• Online Help Systems	Screen and field-specific helps accessible from system applications, also linked to training and reference material.
• Integrated Training	Computer-based training available "on demand" and tailored to the knowledge and skill requirements of the worker's current and projected job.
• Integrated Reference	Materials that are consistent with the training in terms of information and policy, easily accessible, and organized around work requirements.
• Competency Profiles	Cumulative records of knowledge and skills acquired and performed for each worker, linked into the completion of training or work events; available to the worker and manager to help define required skills and record performance.
• Knowledge-Based Advisors	Decision support tools providing customized advice to workers; possible applications including report selection, troubleshooting, and individualized training path determinations.
• System Information Updates (What's New)	Information about system changes and enhancements, new product announcements, etc.

System Applications



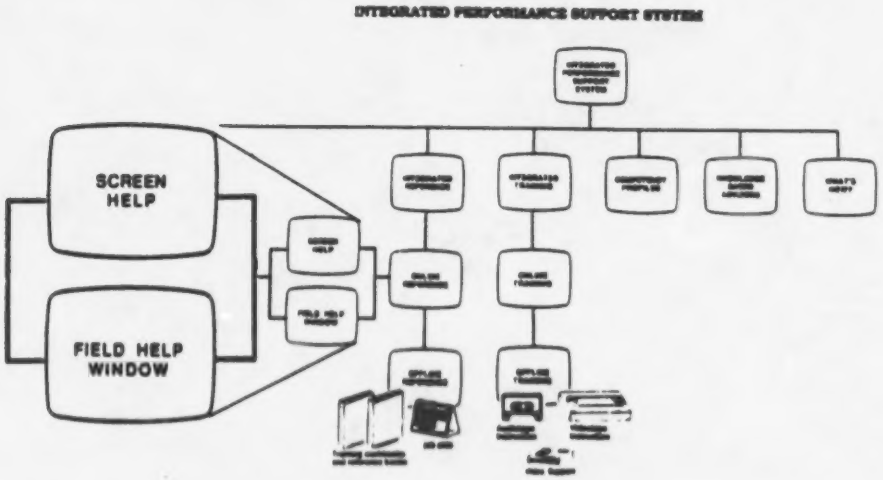
Computers and software application programs continue to gain wide acceptance in today's workplace in spite of a lack of useful end user support. Automated work stations (some intelligent and others not so intelligent) have proliferated in our work environments to the point where they are able to significantly impact worker performance on many levels. However, without a clear vision and plan of how these tools can best be leveraged, we may never see them make their potential contribution.

Most application software programs today require considerable "wrap around" support before workers are productive using them. This support often includes inefficient training, time-consuming interpretation of poorly written reference material and helps, and lots of on-the-job trial and error.

Only the best software applications provide references and helps that are truly helpful. Often helps and reference material are written from the wrong perspective, a system perspective rather than an end user perspective. And, because the training is often formally scheduled and traditionally delivered, it is difficult to access when needed. This creates an end user support gap.

A custom-tailored IPSS can bridge this support gap. Also, as application developers become more aware of their target audience needs, and companies like Apple and IBM create standards and examples of good user interface, the need for some of the elements of an IPSS will disappear. But the challenge of integrating the many systems will remain.

Online Help Systems



Most application software today provides some form of online help facility. However, these "helps" are often not very helpful. They are often too generic and written from the wrong perspective.

Helps that are truly helpful are:

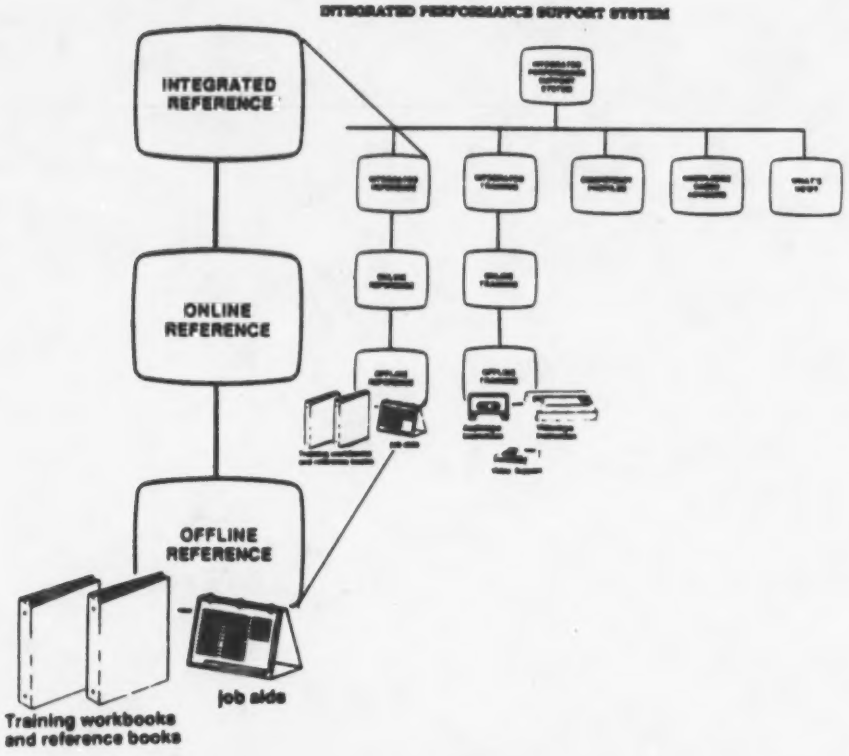
- written from an end user perspective
- specific for screen, field, or business
- easily accessed at the time needed, allowing the user to continue with the work task once help has been provided

Authoring tools such as Preference, provided by Goal Systems; Individual Performance EXCELerator, by SmartWorks Systems; or REF, by Evergreen offer considerable promise. Apple's HyperCard software also offers interesting opportunities. These tools are able to run concurrently with custom-designed applications, enabling end users to ask for assistance at the time they need it. The system remembers where they are, and provides a message that addresses the need, or options for additional sources of help. These system facilities can provide "help windows" that reference or link to modular computer-based training, computer-based reference, and/or job aids.

This type of help approach:

- Enables workers to become productive in less time
- Requires less "wrap around" support (i.e., formal and on-the-job-training, etc.)
- Produces quality work and puts workers more in control of their work environments

Integrated Reference



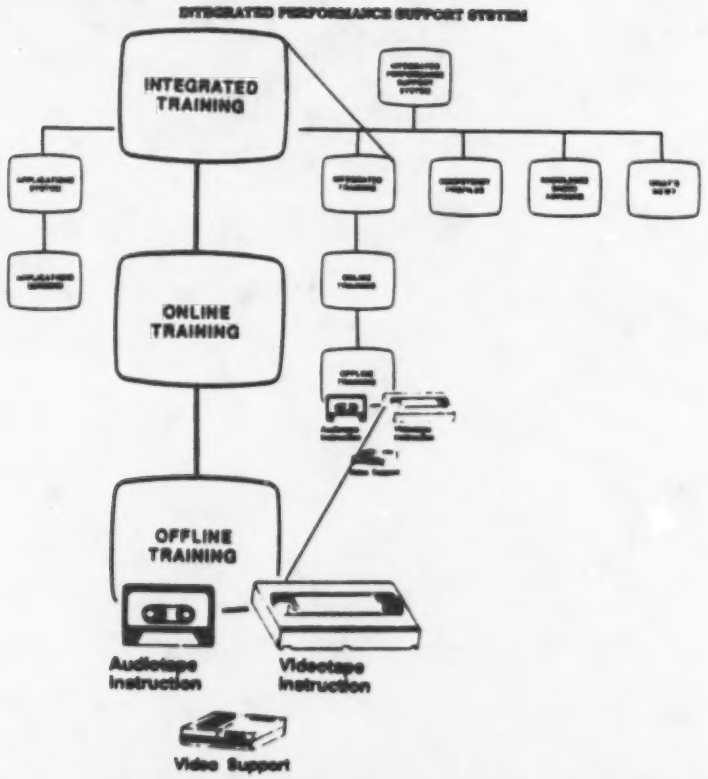
Computer systems today are supported by many forms of reference materials (systems documentation, work flow procedures, indexed job aids, etc.). Even experienced workers often find these tools cumbersome and not always readily available.

The important, useful information should be well-organized, retrieved at the time needed, and suppressed when no longer needed, allowing the worker to get on with the job. An IPSS can provide this easy access.

Computer-Based Reference (CBR) concepts have been around for some time, but few businesses have successfully integrated reference materials into a comprehensive system. Often the absence of an integrated design, (i.e., "the responsibility for documentation is in another department" syndrome), or the lack of capability and/or capacity of the system become constraints that limit the integration. There are also tools like Preference and IP-EXCELerator that allow easy development and user access to online reference.

Today, experienced designers are able to evaluate where and when CBR makes sense, and to develop workable designs that can make reference available when needed.

Integrated Training



Few businesses fully leverage technology to meet their training needs. Traditional approaches to the design and delivery of training will not be affordable in the future. They will not build the competitive work force needed to meet future demands. Traditional approaches are less desirable because of increasing costs in areas such as:

- instructors
- travel to and from training events
- inefficient use of training time

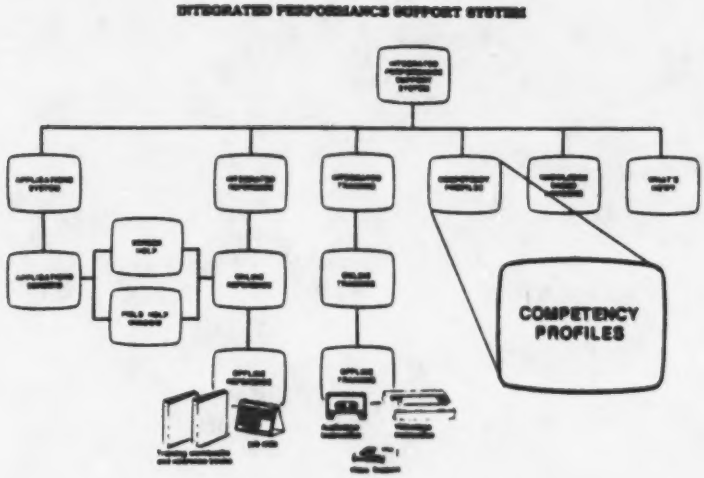
The biggest impact on productivity may be using job analysis to design the application in the first place. Training designs that build on this analysis, leveraging today's technologies, will yield training systems that can be available "on demand" to truly empower our workers.

These training systems need to be:

- well-organized
- easily accessible
- based on needed worker competencies

Training accessed through an IPSS must be more flexible and responsive to end user needs than any traditional system (including traditional CBT) available today. It needs to be modular in its design to provide this flexibility.

Competency Profiles



If a training system has been systematically designed, a careful and complete analysis of job functions has been developed. The job tasks identified during systematic analysis could provide the structure for a worker competency profile.

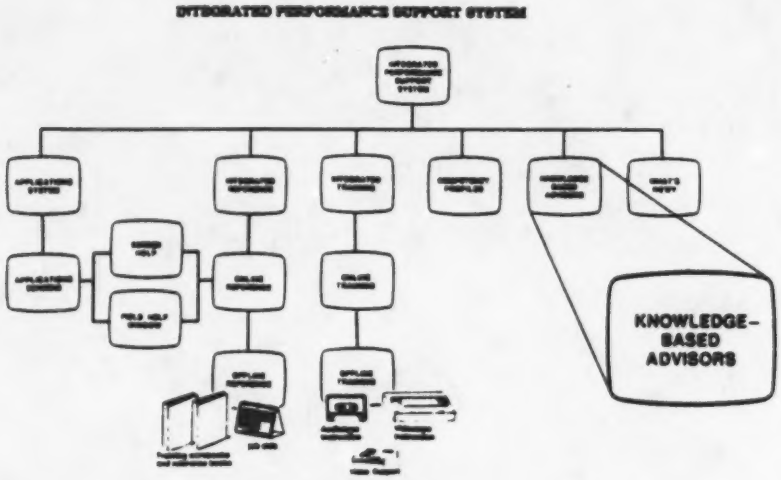
Job tasks form the basis for training module objectives. They can also provide the basis for job description and function definition, as well as worker movement within the personnel system. All of this information could be put into an online, worker-oriented competency profile and linked into the company Human Resource system.

A competency profile can contain the cumulative record of skills and knowledge acquired and performed by a worker. This profile provides a picture of a worker's career and training path options. The profile provides a comprehensive, up-to-date "personnel file" that can be used by managers and workers. The manager is able to track workers and give them guidance about work and training options.

The plan for worker promotion within the personnel system can also be made explicit to the worker. If such a plan is made part of an IPSS, progress can be tracked by both parties as the worker completes desired training modules, performs important work activities, and is promoted through the system.

Today there are mainframe computer applications that do this type of personnel tracking. However, few have integrated these human resources systems with all of the elements of an IPSS (training, CBR, advisors, etc.).

Knowledge-Based Advisors



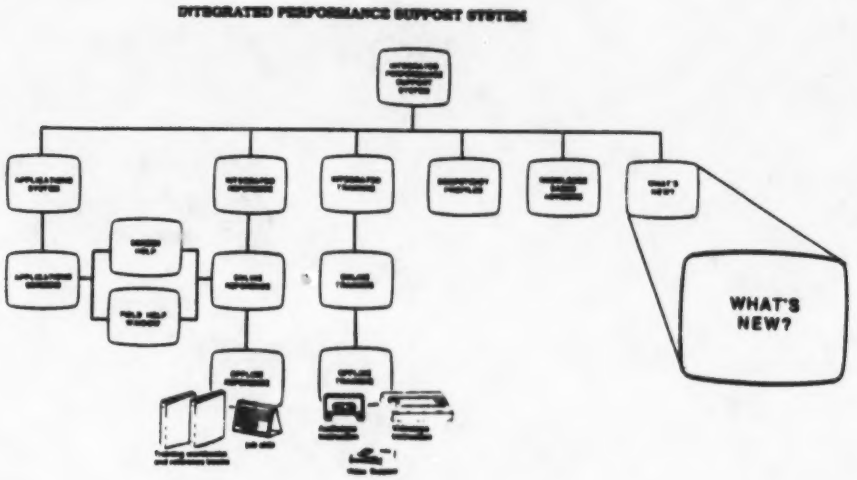
The full promise of intelligent systems (expert systems, artificial intelligence, etc.) is still in the future. However, through the use of PC- and mainframe-based shells available today, useful tools can be put in the hands of end users. Decision support tools can be readily knowledge-engineered and programmed at a reasonable cost and linked into an IPSS.

If an end user wanted to decide what type of report would be appropriate for a given set of circumstances, the IPSS could provide a decision tool that would ask a series of questions leading to the most appropriate choices and recommendations.

Another worker may need to know which CBT modules to take in order to prepare for the next promotion or work team assignment. The worker might access his or her Competency Profile through an IPSS, and still have questions about what specifically is available to gain certain new skills and knowledge. An online decision tool could step the worker through a series of questions and again provide recommendations.

Expert system shells are becoming more powerful every day. They are enabling a wider range of developers to create useful tools that can be integrated into an IPSS vision.

System Information Updates (What's New)



No system stands still. Changes in work function, products, business direction, etc. are constantly happening. When implemented, the ripple effect caused by change can be challenging to people who have worked in yesterday's system. If the IPSS provides regular update information, summarized and readily available at the work station, some of the confusion brought about by change can be lessened.

Picture a worker reporting to his or her work station and signing on to an IPSS. The first option the worker selects off the "main menu" is *What's New*. He or she then has access to a series of screens indicating what is new in the system, what new product training modules are now available under the training option, and what changes have been made to the reporting procedures.

Such a feature in the IPSS could serve as a director or conductor, pointing end users to things that they might find helpful or necessary in doing their jobs.

Implementing an IPSS Solution

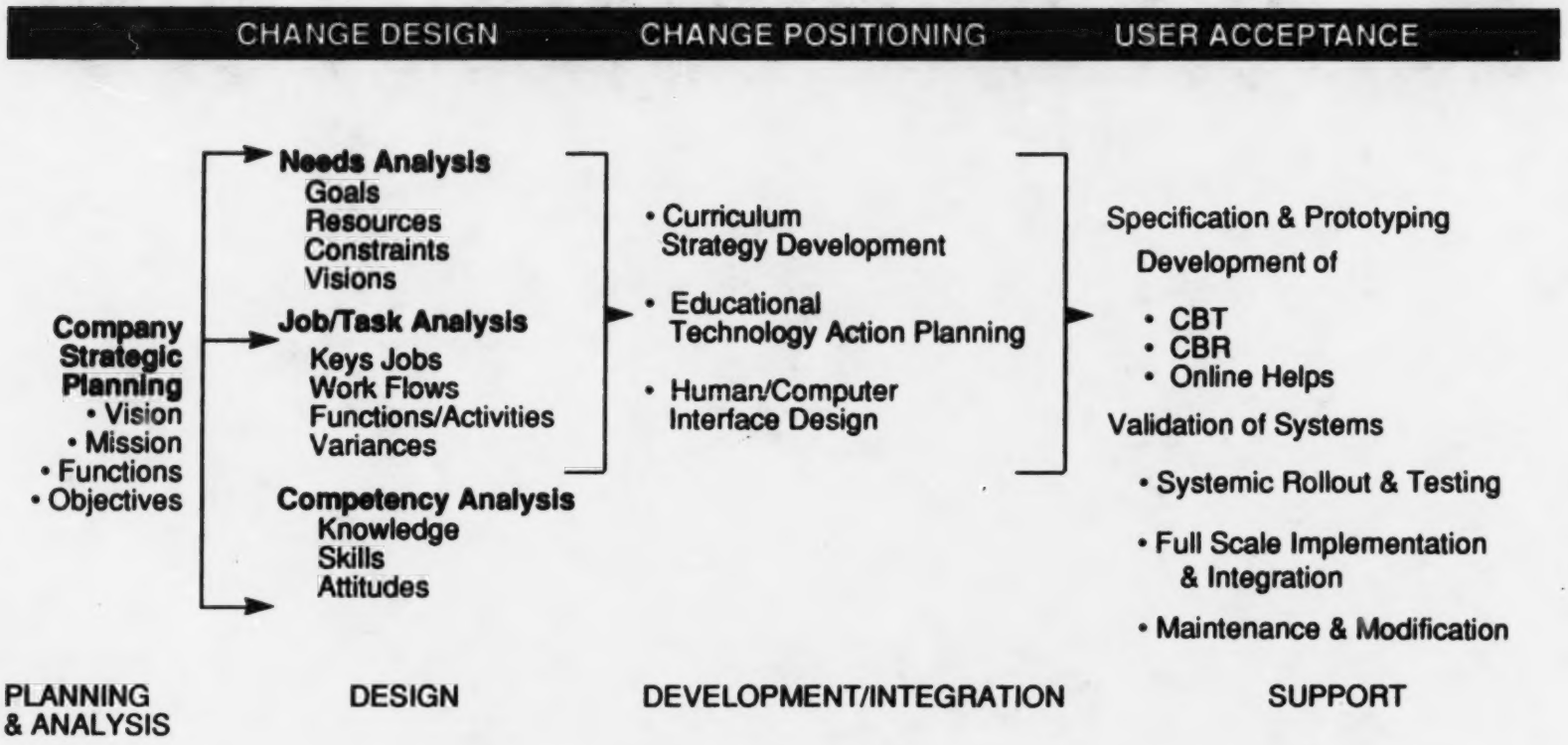
Components of performance support systems are available and are being used in organizations today. However, they are not often integrated or leveraged properly. Formulating a vision of what is possible through an IPSS solution is the first important step in developing an integrated solution.

This vision requires a clear understanding of end user needs, and how an IPSS can meet these needs. It should be obvious that integrating technology without an understanding of how and why people need to use it may not yield performance improvement.

Once the vision is clear, obtaining executive sponsorship for systematic integration of performance support solutions is essential. The Courseware/Andersen Consulting process for introducing technology change can provide first, the systematic framework needed to gain sponsorship, and then, a plan to integrate and implement an IPSS.

Our Technology Assimilation methodology is designed to help clients carefully position technology and their workforce for mutual improvement. It applies to IPSS solutions the same proven approach we use for new or converted information systems or manufacturing operations. The diagram on the next page illustrates (at a high level) the workflow of this methodology.

TECHNOLOGY ASSIMILATION WORKFLOW
(SUMMARY LEVEL)



This methodology addresses all critical issues, including organization and technology change plans, overall system design, and organizational transformation.

The vision of a modern integrated work environment is attainable today--where people working with technology are trained and supported when needed. Courseware/Andersen Consulting is helping companies realize this vision and we are ready to help others.